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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,877	11/20/2003	Robert J. Lowles	555255012639	9366

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RIDOUT & MAYBEE
SUITE 2400
ONE QUEEN STREET EAST
TORONTO, ON M5C3B1
CANADA

EXAMINER	
DINH, DUC Q	

ART UNIT	PAPER NUMBER
2629	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/717,877	LOWLES ET AL.
	Examiner	Art Unit
	DUC Q. DINH	2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 20 November 2003.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is responsive to the Application filed on November 20, 2003. Claims 1-20 are currently pending and being examined.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on November 20, 2003 is being considered by the examiner.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 8 recites the limitation "the electrical characteristic" in line 1.

Claim 10 recites the limitation “the switches” in line 4, “the switch” in lines 5 and 7.

There are insufficient antecedent basis for these limitations in the claim.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Johnston et al. (U.S Patent No. 4,529,968), hereinafter Johnston.

In reference to claim 1, a touchscreen liquid crystal display (Fig. 2) comprising:

a liquid crystal display including: a viewing surface (17), a liquid crystal area (area between layer 30 and 32) containing liquid crystal (34) located behind the viewing surface a plurality of spaced apart elongate first electrodes (38) located on a viewing surface side (17) of

the liquid crystal area (34) and a plurality of spaced apart elongate second electrodes (42) located on an opposite side of the liquid crystal area (34), the first and second electrodes overlapping to form an array of liquid crystal pixel elements (44), at least some of the first electrodes being displaceable towards the second electrodes in response to external pressure (pressure from stylus 15) applied to the viewing surface (Fig. 2 shows the first electrodes 38 being displaced towards electrodes 42 when pressured from stylus 15 is applied to a viewing surface 12) flexibility and resilience of layer 30 are such that pressing at a point on the surface (e.g., 17) will deform layer 30 in a localized region at the point of pressure causing the electrodes 38 displaceable toward second electrodes 42; See Fig. 2, col. 2, lines 36-40); and

a control circuit (52,54,56 and 60) connected to the first and second electrodes for controlling the operation of the liquid crystal display (40) and including:

(i) a driver circuit (52 and 56) for driving the electrodes for selectively controlling a display state of the pixel elements; (Fig. 3, displaying image is accomplished in the conventional way of the LCD by column driver 56 and row driver 52; col. 3, lines 13-24 and col. 4, lines 4-19).

(ii) a measurement circuit (60 and 54) for detecting displacement of the at least some of the first electrodes in response to external pressure applied to the viewing surface (for information input purposes, control circuitry 54 is also connected to a set of input sensors 60 Each input sensor 60 is in turn connected to one of the column conductors 38 for sensing an electrical value related to the conductance of various ones of the elements 50 connected to the conductor, such conductances being indicative of which elements 50 are being subjected to pressure; col. 3, lines 25-33).

In reference to claim 2, Johnston discloses the measurement circuit (54 and 60) is configured for measuring voltages across at least some of the pixel elements and detecting the displacement based on the measured voltages (each sensor 60 detects whether the sensed voltage appearing across an element 50 as a result of the pressure of stylus 15, causing the displacement between electrodes 38 toward electrodes 42; col. 3, lines 32-36).

In reference to claim 3, Johnston discloses wherein the measurement circuit (60 and 54) is configured for determining a location of the external pressure on the viewing surface based on the measured voltages (sensor 60 is arranged to sense pressure at the element 50 corresponding to that pixel whether or not that pixel is simultaneously being displayed. If that pixel is being displayed, the field used to cause the display may itself induce changes in the conductance of the corresponding element 50 similar to the changes produced by pressure on that element. In that case, the output of the source driver 52 is then used as an input to the voltage comparator circuit of sensor 60 to offset the effect of the drive voltage, thus permitting the sensor to detect that element 50 is being pressed; col. 4, lines 43-53).

In reference to claim 4, Johnston discloses the measurement circuit (54 and 60) is configured for determining a relative force of the external pressure on the viewing surface based on the measured voltages (each sensor 60 can be of the type having CMOS inverter gates which detect whether the sensed voltage appearing across an element 50 as a result of the pressure of stylus 15, causing the displacement between electrodes 38 toward electrodes 42is greater than a threshold voltage of the gate; col. 3, lines 32-36).

In reference to claim 8, Johnston discloses the electrical characteristic is a voltage measured across each of the measured pixel elements, the location of the external pressure being determined based on which measured pixel element voltage varies the greatest from a reference value (each sensor 60 can be of the type having CMOS inverter gates which detect whether the sensed voltage appearing across an element 50 [pixel element 50] as a result of the pressure of stylus 15 is greater than a threshold voltage of the gate. Each sensor 60 also includes a voltage comparator circuit (e.g., type .mu.A3302 available from Fairchild) for allowing the detection of differential voltage levels; col. 3, lines 34-40).

In reference to claim 9, Johnston discloses the each of the first and second electrodes is a substantially transparent strip electrode (conductors 38 and 42 are transparent; column 2, lines 45-55), the first electrodes being arranged substantially parallel to each other, the second electrodes being arranged substantially parallel to each other and substantially orthogonal to the first electrodes for defining the array of pixel elements, each pixel element being associated with one of the first electrodes and one of the second electrodes (conductors 42 run along the length of pad 10 and conductors 38 along its width, thus forming a grid defining a matrix of pixels, display elements, on surface 12, each pixel being defined by the intersecting pair of conductors 38, 42 which underlie that pixel; col. 2, lines 54-58), the measuring circuit (54 and 60) including a sampling circuit (each input sensor 60 is in turn connected to one of the column conductors 38 for sensing an electrical value related to the conductance of various ones of the elements 50 connected to the conductor, such conductances being indicative of which elements 50 are being subjected to pressure, col. 3, lines 27-35) for sampling a voltage across each of the pixel

elements (50) and a processing circuit (54) for detecting the displacement and a location thereof based on the sampled voltages (control circuitry 54 includes a column selector which accepts bits from particular sensors 60, indicating which elements 50 are being subjected to pressure, and delivers display bits to sink drivers 56, corresponding to an image to be displayed, as dictated by trigger signals provided from an interlace controller 72, col. 3, lines 41-46).

In reference to claim 10, Johnston discloses wherein a plurality of scan-able electrodes (42) are included among at least one of the first electrodes and the second electrodes (38 and 42), each scan-able electrode being connected by an associated switch to the driver circuit (54), the sampling circuit including a controller for individually controlling the switches, the controller being configured for opening the switch associated with a selected scan-able electrode and causing the voltage across the pixel elements associated with the selected scan-able electrode to be sampled when the switch associated therewith is opened control circuitry 54 includes a column selector 70 (controller 70 for individually controlling the switches which accepts bits from particular sensors 60, indicating which elements 50 are being subjected to pressure, and delivers display bits to sink drivers 56, as dictated by trigger signals provided from an interlace controller 72, col. 3, lines 41-46).

In reference to claim 12, Johnston discloses a method for using a liquid crystal display as a user input (see abstract), the liquid crystal display (Fig. 2) having a plurality of first electrodes (38) and a plurality of second electrodes (42) located on opposite sides of a liquid crystal containing area, the first electrodes overlapping with the second electrodes defining an array of liquid crystal display pixel elements (44; Fig. 2), each pixel element being associated with a unique location where an associated one of the first electrodes (38) overlaps with an associated

one of the second electrodes (42), at least some of the first electrodes being displaceable towards the second electrodes when pressure is applied to a viewing surface (12; Fig. 2 shows the first electrodes 38 being displaced towards electrodes 42 when pressured from stylus 15 is applied to a viewing surface 12) of the liquid crystal display, the method including (see rejection as applied to claim 1):

(a) selectively driving the first and second electrodes to cause the pixel elements to display an image visible from a viewing side of the viewing surface (see Fig. 3, displaying image is accomplished in the conventional way of the LCD by column driver 56 and row driver 52; col. 3, lines 13-24 and col. 4, lines 4-19;

(b) sampling voltages between the first and second electrodes (using sensor circuit 60; sensor 60 is arranged to sense a pressure at the element 50 correspondence to that pixel; col. 4, lines 42-45); and

(c) determining based on the sampled voltages if any of the first electrodes have been displaced towards the second electrodes (for information input purposes, control circuitry 54 is also connected to a set of input sensors 60 Each input sensor 60 is in turn connected to one of the column conductors 38 for sensing an electrical value related to the conductance of various ones of the elements 50 connected to the conductor, such conductances being indicative of which elements 50 are being subjected to pressure; col. 3, lines 25-33).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnston in view of Penz (U.S Patent No. 4,224,615).

In reference to claim 5, Johnston discloses disclose the sensor circuit 60 detect whether the sensed voltage appearing across element 50 as a result of the pressure of the stylus 15 is compared with a threshold voltage (col. 3, lines 33-40). However, Johnston does not disclose a reference pixel element and the measured voltage is compared to a reference voltage from at least one pixel element.

Penz discloses a method of using a liquid crystal display device as a data input device as well as display information (col. 1, lines 10-11; col. 5, lines 52-65; Fig. 3; distance between electrodes of the LCD is decreased upon receiving external force by a finger may be measured in LCD driver circuit) using a standard cell (C, reference pixel element) in the area of the display which preferably is not or cannot to be touch thereby permitting the impedance comparison with comparison circuit to selective compare with the other cells being applied with a external force by a finger, i.e.; comparing a measured voltage at the touched location on the display and a reference voltage from the pixel reference; col. 6, lines 33-43 and Fig. 5 of Penz).

It would have been obvious for one of ordinary skill in the art at the time of the invention to learn the method of using a standard cell to comparing the voltage of the reference cell with

the measured voltages from the touched area when an external force is applied to the display in the device of Johnston as taught by Penz because it would provide a fixed reference data to the comparison circuit for calculating accurate output for the touch panel when the liquid crystal display is used an input device.

In reference to claim 6, Penz discloses the reference pixel element (C) is located outside of a viewable area of the liquid crystal display a sufficient distance so as not to be substantially affected by external pressure applied to the viewing surface (the opposing segment pair at reference C is preferably a standard cell in the area of the display which preferably is not or cannot be depressed, thereby permitting the impedance comparison circuit to selectively compare first cell A with cell C and then cell B with cell C and so forth for the various cells of the LCD display; col. 6, lines 33-39 of Penz).

8. Claims 7, 13-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnston in view of Bisset el al. (U.S Patent No. 5,920,309), hereinafter Bisset.

In reference to claim 7, Johnston does not discloses the control circuit is configured for operating in a first mode and in a second mode, wherein in the first mode the measurement circuit measures an electrical characteristic of a subset of the pixel elements until the measured electrical characteristic indicates that external pressure has been applied to the viewing surface, after which the control circuit automatically operates in the second mode, wherein in the second mode the measurement circuit measures the electrical characteristic for a larger set of the pixel elements and determines the location of the external pressure based thereon. Bisset discloses a touch pad having a control circuit (22 50) that measures an electrical characteristic of a sub-set of

pixel, one of every three traces, in a sleep mode, i.e. a first mode, until the measured electrical characteristic indicates that external pressure has been applied, a the control circuit automatically operates in a regular mode, the second mode, wherein in the second mode the measurement circuit measures the electrical characteristic for a larger set of the pixel elements and determines the location of the external pressure based thereon (all of the these traces are driven and sensed simultaneously, the that the present of a finger anywhere on the pad is substantially detected and a normal mode in which it is possible to selectively drive and sensed a plurality of traces, sufficient to identify whether a finger have been placed anywhere on the pad (col. 4, lines 5-19).

It would have been obvious for one of ordinary skill in the art at the time of the invention to learn the teaching of driving a touch pad in which selection of traces is driven in the sleep mode, in the device of Johnston for placing the driving circuit of the touch input device in low power mode such as sleep or standby to reduce power consumption for the system (col. 8, lines 5-8).

In reference to claim 13, Johnston does not discloses the sampling step includes sampling voltages between the first and second electrodes at at least some of the pixel element locations. Bisset discloses a touch sensing method that includes sampling voltages between the first and second electrodes at at least some of the pixel element locations. (a modulator 40 drives, i.e. sampling voltages, two selected traces through a two channel analog multiplexer 50 … the voltage amplitude of the wave depends on the capacitance associated with the selected electrodes, including any capacitance due to finger loading; col. 1, lines 54-60; col. 3, lines 55-60 and Fig. 1 of Bisset).

It would have been obvious for one of ordinary skill in the art at the time of the invention to learn the teaching of Bisset, i.e. sampling voltage between two traces (electrodes) at at least some pixel element locations, in the device of Johnston because it would permit multiple finger to be identified, and in addition, allows the relative movement of a finger to be monitored on the touch input area (col. 3, lines 57-59 of Bisset).

In reference to claim 14, Bisset discloses the sampling voltages at a sub-set of pixel element locations until a determination is made that a displacement of first electrodes has occurred and then sampling voltages at a larger set of pixel element locations and determining based on the sampled voltages from the larger set a relative location of the displacement (the analog multiplexer includes a special mode for selection of, for example, one of every three traces, i.e. sampling a subset of pixel element locations on the touch pad, at the sleep mode. All of these traces are then driven and sensed simultaneously, such that the presence of a finger anywhere of the pad is immediately detected; col. 4, lines 11-19; and sampling set of pixel element location, represent entire pad, to identify whether a finger have been placed down anywhere on the pad; col. 4, lines 5-11 of Bisset).

It would have been obvious for one of ordinary skill in the art at the time of the invention to learn the teaching of driving a touch pad in which selection of traces is driven in the sleep mode, in the device of Johnston for placing the driving circuit of the touch input device in low power mode such as sleep or standby to reduce power consumption for the system (col. 8, lines 5-8).

In reference to claim 15, wherein the sub-set of pixel element locations includes pixel element locations associated only with a single line in the array of pixel elements (the

multiplexer 50 selects *one* or more traces, i.e. the sub-set of pixel element locations includes pixel on a single line, one trace, of the array of pixel elements [selected pixel on a single trace]; col. 3, lines 59-65).

In reference to claim 16, Bisset discloses a sub-set of pixel element locations includes a plurality of spaced apart groups of pixel element locations (it may be preferred to drive one or more X traces and sense one or more Y traces; for example, driving T5 (an X trace) and sensing T32 (a Y trace), i.e. plurality of spaced apart group of pixels element locations. In such an arrangement the selection of traces permits several fingers to be distinguished, allowing other features to be implemented; col. 3, line 65 – col. 4, line 1).

In reference to claim 17, Bisset disclose the sampling of the sub-set is carried out at a lower rate than sampling of the larger set (only three traces sampling in the sleep mode; col. 4, 12-14).

In reference to claim 18, Bisset discloses based on the measured voltages from the sub-set a general location of the displacement is determined, and the larger set is selected to include the general location (analog mux 50 includes a special mode for selection of, for example, one of every three traces. All of these traces are then driven and sensed simultaneously, such that the presence of a finger anywhere on the pad is substantially immediately detected; col. 4, lines 13-19).

In reference to claim 19, Johnston discloses determining a relative location of the displacement and a relative magnitude of the force causing the displacement based on the measured voltages and translating the determined location and magnitude into at least one input value for an electronic device associated with the display, (each sensor 60 can be of the type

having CMOS inverter gates which detect whether the sensed voltage appearing across an element 50 as a result of the pressure of stylus 15 is greater than a threshold voltage of the gate. Each sensor 60 also includes a voltage comparator circuit for allowing the detection of differential voltage levels[i.e. determining a relative location of the displacement and relative magnitude of the force causing the displacement based on the measure voltage; col. 3, lines 33-51]. Controller 72 interleaves the displaying of pixels of an image specified by the data processor with the reading of entered information, [i.e. determine the relative location of the displacement… and translating the determined location into at least one input value for an electronic device 10 associated with the display], which is passed back to the data processor, all via line 22; col. 3, lines 51-55).

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnston in view of Nohno et al. (U.S Patent No. 6,239,788) hereinafter Nohno.

In reference to claim 11 Nohno does not disclose the electrodes are Indium-Tin Oxide. Nohno discloses a liquid crystal display using display electrodes as touch input electrodes S and C (Fig. 8) made of Indium-Tin Oxide as claimed.

It would have been obvious for one of ordinary skill in the art at the time of the invention to provide the electrode made of Indium-Tin Oxide in the touch display panel of Johnston because the Oxide as touch electrodes as well known the art of touch sensing input device as discloses by Nohno because it would provide transparent electrodes that make the display screen transparently clear to provide quality images (see col. 2, lines 53-55 of Nohno)

10. Claims 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnston in view of Bisset el al. (U.S Patent No. 5,920,309), hereinafter Bisset 309' as applied to claims 13-19 above and further in view of Bisset et al. (U.S Patent No. 5,543,588), hereinafter Bisset 588'.

In reference to claim 20, the combination of Johnston and Bisset 309' does not including determining the center of deflection of the displaced first electrodes by determining, based on the measured voltages, a weighted average of the deflection at a plurality of the pixel locations and determining a centroid of the deflection based on the weighted average.

Bisset 588' discloses a touch pad having a position encoder 40 (Fig. 2) uses the current inputs as weights, and provides a scaled weighted mean (centroid) of the set of input currents and their relation to their position in the sensor. Position encoder circuit 40 is a linear position encoder having a voltage output which varies between the power supply rails (col. 12, lines 1-5; col. 19, lines 50-64).

It would have been obvious for one of ordinary skill in the art at the time of the invention to provide the method of using scaled weighted mean (centroid) to determining the position of the touch input in the combination of Johnston and Bisset 309' as taught by Bisset 588' because it would produce a continuous weighted mean over all input values, it is capable of interpolation to a much finer resolution than the spacing of the matrix grid spacing (col. 12, lines 6-9).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DUC Q DINH whose telephone number is (571) 272-7686. The examiner can normally be reached on Mon-Fri from 8:00.AM-4:00.PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe can be reached on (571) 272-7691. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DUC Q DINH
Examiner
Art Unit 2629

Ducdinh

DQD
June 19, 2006